

STUDY OF ROLE OF NEO – ADJUVANT CHEMO-RADIO THERAPY IN COLORECTAL MALIGNANCY

**DISSERTATION SUBMITTED FOR
MASTER OF SURGERY (BRANCH I)
GENERAL SURGERY
DEGREE EXAMINATION
MARCH – 2010**



**THE TAMILNADU
Dr. M. G. R. MEDICAL UNIVERSITY
CHENNAI**

Department of General Surgery,
Madurai medical college,
Government Rajaji Hospital,
Madurai

CERTIFICATE

This is to certify that the dissertation entitled “**STUDY OF ROLE OF NEO
– ADJUVANT CHEMO-RADIOTHERAPY IN COLORECTAL MALIGNANCY**”
submitted by **DR.K.VENUGOPALA** to the faculty of surgery, The Tamil nadu Dr.
M.G.R. Medical university, Chennai in partial fulfillment of the requirement for the
award of **M.S. Degree in GENERAL SURGERY** is a bonafide work carried out by him
during the period of April 2008 – November 2009 under my direct supervision and
guidance.

Place : Madurai

Date :

Professor and Head
Department of General Surgery,
Madurai Medical College,
Madurai.

DECLARATION

I, DR.K.VENUGOPALA solemnly declare that the dissertation titled **“STUDY OF ROLE OF NEO – ADJUVANT CHEMO-RADIOTHERAPY IN COLORECTAL MALIGNANCY”** has been prepared by me.

This is submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfillment of the requirement for the award of Master of Surgery, **(Branch I) General Surgery** Degree Examination to be held in March 2010.

Place : Madurai

Date :

DR.K.VENUGOPALA

ACKNOWLEDGEMENT

- I Sincerely express my thanks to my unit chief (rtd) Prof.,Dr. V. SeethaRaman M.S., Prof of Principles & Practice of Surgery, (rtd) for his guidance in selecting and encouragement for the study.
- I am thankful to Prof, & HOD Dr.S.Gopinath M.S., and also unit incharge for his valuable guidance through my study.
- I am grateful to Prof & HOD'S Dept. of surgical Gastro-Enterology & Proctology and Dept. of Surgical Oncology Prof Dr.Muthukrishnan M.S., Mch (SGE) , Prof Dr. B.K.C. Mohanprasad M.S. Mch (sur.oncology) for their guidance and support and allowing the patients from their departments to get enrolled in the study.
- I thank all my unit assistant professors Dr.A.Shankaramahalingam, M.S., Dr.M.Sekaran, M.S., Dr.S.Chitra.M.S., D.G.O.,(OG), Dr.M.Manikandan M.S., MRCS Dr.Ashokchakravathy M.S., for their support and guidance in my study.
- I am thankful to our beloved Dean, Dr.S.M. Sivakumar M.S., for permitting the patients getting admitted in GRH, Madurai for this study.
- I sincerely thank Professor and Head of the Department of Radiation Oncology and Professor and Head of the Department of Medical Oncology, without whom this study would not have been completed.
- I sincerely thank lastly but not the least to all patients involved in this study for their kind co-operation and allowing me to complete the study.

CONTENTS

	PAGE NO.
1. INTRODUCTION	1
2. AIM OF THE STUDY	4
3. SURGICAL ANATOMY OF COLON & RECTUM	5
4. EPIDEMIOLOGY	10
5. PATHOPHYSIOLOGY	11
6. REVIEW OF LITERATURE	42
7. MATERIAL AND METHODS	47
8. RESULTS	51
9. DISCUSSION	56
10. CONCLUSION	58
ANNEXURE	
BIBLIOGRAPHY	
PROFORMA	
MASTER CHART	
ABBREVIATIONS	

INTRODUCTION

Adenocarcinoma of the colon and rectum is one among most common site of new cancer cases and deaths in both men (following prostate and lung/bronchus) and women (following breast, cervix and lung/bronchus). The lifetime risk for developing invasive colorectal cancer increases with age, with more than 90% of new cases being diagnosed in patients older than 50 years.

Colorectal cancer occurs in hereditary, sporadic, or familial forms. Hereditary forms of colorectal cancer have been extensively described and are characterized by family history, young age at onset, and the presence of other specific tumors and defects. Familial adenomatous polyposis (FAP) and hereditary nonpolyposis colorectal cancer (HNPCC) have been the subject of many recent investigations that have provided significant insights into the pathogenesis of colorectal cancer.

Sporadic colorectal cancer occurs in the absence of family history, generally affects an older population (60 to 80 years of age), and usually presents as an isolated colon or rectal lesion. Genetic mutations associated with the cancer are limited to the tumor itself, unlike hereditary disease, in which the specific mutation is present in all cells of the affected individual. Nevertheless, the genetic of colorectal cancer initiation and progression

proceed along very similar pathway in both hereditary and sporadic forms of the disease.

Cancers arising in the distal 15cms of the large bowel share many of the genetic, biologic, and morphologic characteristics of colon cancers. However, the unique anatomy of the rectum, with its retroperitoneal location in the narrow pelvis and proximity to the urogenital organs, autonomic nerves, and anal sphincters, make surgical access relatively difficult. In addition, precise dissection in appropriate anatomic planes is essential because dissection medial to the endopelvic fascia in vesting the mesorectum may doom the patient to local recurrence of the disease, and dissection laterally to the avascular anatomic space risks injury to the mixed autonomic nerve, causing impotence in men and bladder dysfunction in both sexes.

Furthermore, the biologic properties of the rectum, combined with its anatomic distance from the small intestine afforded by its retroperitoneal pelvic location, provides an opportunity for treatment by radiation therapy.

The treatment of colorectal cancer has changed significantly during the past 20 years, and there is considerable controversy today concerning the precise role of surgery, radiation therapy, and chemotherapy, and the ideal timing of each modality with relation to the others. Although information

from clinical trials has provided data supporting the multimodality treatment of rectal cancer, the criteria for patient selection remains controversial.

According to recent analysis preoperative radiation is superior to postoperative radiation.

The best course of neoadjuvant treatment has not yet been determined.

Neoadjuvant chemoradiation may increase the ability of the surgeon to preserve continence by down-staging the cancer, in some instance shrinking the size of the tumor to permit the achievement of a cancer-free margin at the distal extent of the resection, when a clear margin that would permit an anastomosis could not be achieved without such shrinkage.

Increased number of colo-rectal surgeons has shown improved outcomes, evidencing that “the surgeon” has to be listed as a “risk-factor”.

Finally, to still improve surgical outcomes a further effort was made, since twenty years to now, by employing adjuvant therapies - Radiotherapy (RT) and Chemotherapy (CT) - resulting in significant reduction of local recurrence rates, however partially improving mortality but exposing patients to high morbidity.

Later on, a continuous change of adjuvant approach has been developed: in short, adjuvant therapy has been replaced, step by step, by neo-adjuvant approach.

AIM OF THE STUDY

To evaluate the usefulness of Neoadjuvant chemo-radiotherapy in colorectal carcinoma.

To improve the rates of surgeries feasible following neoadjuvant therapy

ANATOMY OF COLON & RECTUM

The Colon & Rectum constitutes a tube of variable diameter about 150cm in length. The terminal ileum empties into the caecum through the ileocaecal valve.

The caecum is a capacious sac like segment of the proximal colon with an average diameter of 7.5cm & 10cm in length.

The appendix extends from caecum about 3cm below the ileocaecal valve as a blind ending elongated tube of 8-10cm length.

The ascending colon about 15cm in length runs upwards towards the liver on right side, like the descending colon, the posterior surface is fixed against the retroperitoneum, where lateral & anterior surfaces are true intraperitoneal structures.

The Transverse colon is about 45cm in length, hanging between fixed portions at the hepatic & splenic flexures, it is completely invested in visceral peritoneum.

The nephrocolic ligament secures the hepatic flexure & directly overlies the right kidney, duodenum & portahepatis.

The phrenocolic ligament lies ventral to the spleen & fixes the splenic flexure in left upper quadrant. The angle of splenic flexure is higher, more acute & more deeply situated than the hepatic flexure.

The superior aspect of transverse colon is attached to Greater Omentum.

The descending colon lies ventral to the left kidney and extends downwards from splenic flexure for about 25cm. It is smaller in diameter than Ascending colon.

At the pelvic brim, there is transition from descending colon to Sigmoid colon.

The Sigmoid colon varies in from 15 to 50cm(avg.38cm) in length and is very mobile. The mesosigmoid is frequently attached to the left pelvic sidewalls.

The rectum is 12 to 15cm in length and lacks taenia coli and occupies the curve of the sacrum in true pelvis and posterior surface is almost completely extraperitoneal.

The Rectum possesses three involution or folds known as valves of Houston.

The middle fold to left & proximal and distal valve fold to right.

The posterior aspect of rectum is invested with a thick closely applied mesorectum.

A thin layer of investing fascia propria coats the mesorectum & distincts from the presacral fascia.

Pararectal fascia; the endopelvic fascia is a thick layer of parietal peritoneum that lines the walls & floor of the pelvis.

Presacral fascia- portion closely applied to the peritoneum of anterior sacrum.

Fascia propria- thin condensation of endopelvic fascia & forms a envelop around the mesorectum and distally forms the lateral sacral ligaments containing the middle rectal artery.

Waldeyers fascia- rectosacral fascia, thick condensation of endopelvic fascia, connects the presacral fascia to fascia propria.

Dissection between fascia propria & presacral fascia allows the principles of surgical oncology and minimizes the risk for vascular or neural injuries.

Arterial supply:

Superior mesenteric artery through,

- Ileo colic artery
- Right colic artery
- middle colic artery

Inferior mesenteric artery through,

- left colic artery
- sigmoid arteries
- superior rectal arteries.

Internal iliac artery through,

- middle rectal & inferior rectal arteries.
- Venous drainage of colon & Rectum mirror the arterial supply.
- SMV – right & proximal transverse colon.
- IMV - distal transverse, descending, sigmoid and most of rectum which drains into splenic vein to the left of Aorta.
- LYMPHATIC drainage : arranged in four tiers

First tier - epicolic, adjacent to colon

Second tier- paracolic, along marginal vessels

Third tier - along the named branches.

Fourth tier - Principal nodes along SMA, IMA.

Lymph node invasion by metastatic cancer is important prognostic factor for colorectal ca. Accurate pathologic assessment of LN is essential for accurate staging.

Nerve supply:

Preganglionic sympathetic from T10-T12 to right & transverse colon.

Parasympathetic from right vagus to right & transverse colon.

Sympathetic supply to left colon & rectum from L1-L3.

The lower rectum from pelvic plexus.

EPIDEMIOLOGY

The incidence of large bowel cancer varies between and within countries, which strongly suggests an environmental cause. The incidence is almost equal between the sexes, with some difference in risk ratio for cancers of different parts of the large bowel, Rectal cancers are twice as common among men but for the rest of the large bowel the male : female ratio is about 8 :1 with right — sided cancers even more common in women.

The incidence of large bowel cancer is high in the urban 'Western' world but is rare in Asia, Africa and parts of south America. There are also apparent geographical differences in incidence within countries.

Approximate incidence per 1,00,000 people

Africa	2
Asia	15
South America	15
West Europe	40
USA	35

For example the incidence is higher in Scotland than in England, and higher in Northern Italy and the northern United States than in the southern parts of the same countries. The minor changes in incidence of coronary heart disease. This north / south divide is not a fundamental association with latitude.

PATHOPHYSIOLOGY

GENETIC FACTORS:

The epidemiological evidence so far suggests that environmental factors predominate in the genesis of large bowel cancer within populations, but it would be surprising if inherited genetic factors did not play a numerically small yet important role in the formation of colorectal cancers.

Colorectal cancer, in common with all tumours, show qualitative and often quantitative changes in the chromosomes when compared to normal cell. Many colon cell line show chromosome distortion, with trisomy of some or many chromosomes, sometimes to the point aneuploidy. There is evidence to suggest that tumours with a poor bizarre chromosomal configuration with a greater proportion of aneuploid cells.

Some genes or gene deletions may also provide some protection against the development of cancer, in much the same way that possession of the recessive sickle — cell or thalassaemia genes protect against malaria to some extent. It seems that the cystic fibrosis gene deletion, Delta F508 condon, which is carried by about 1 in 27 people, may protect against colorectal cancer and some other tumours.

The incidence of bowel cancer among the Finns and the Eskimos is low, suggesting the differences are more likely to be due to differences in social and dietary behaviour, perhaps induced by climatic changes. The incidence is also different in cultural groups within countries for example, 18/100000 white South Africans have colorectal cancer which the incidence amongst their black compatriots is about 6/100 000. The proportions in New Zealand whites and Maoris are similarly 3:1. though the incidence is about twice that of South Africa.

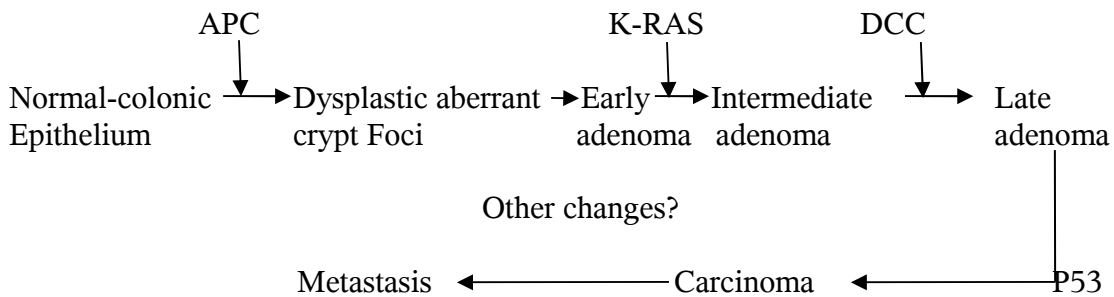
The peak incidence for the disease is in the seventh decade, some 5 years later than the corresponding peak for colonic adenomatous polyps, which suggests that prolonged exposure to weak environmental carcinogens is necessary to induce tumours and that most, possibly all, pass through the benign phase before turning malignant.

The epidemiology of proximal and distal rectal cancer is not the same worldwide. The ratio of rectal to colonic cancer varies from 1:3 in white South African males to 1:1 in Finns and Maoris.

Colo Rectal cancer Genetics:

The field of colorectal cancer genetics was revolutionized in 1988 by the description of the Genetic changer involved in the progression of a benign adenomatous polyp to invasive carcinoma.

The Fearon – vogelstein adenoma – carcinoma multistep model of colorectal neoplasia represents one of the best known models of carcinogenesis.



ADENOMAS AND PAPILLOMAS:

According to Dukes there exists a close relationship between benign and malignant epithelial tumours of the intestine. The following observations are in favour of above statement.

1. It has been frequently observed that patient with adenoma or papilloma of colon and rectum have developed carcinoma.
2. Often there exists a small focus of carcinoma in a tumors which has histological characteristics of adenoma, and villous papillomas in its greater part.
3. On careful search a surviving position of a benign tumour may be seen at the edge of a frank carcinoma.

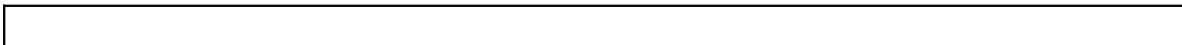
The risk of malignant transformation depends on the characteristic of the adenoma. Nearly 5% of the tubular adenoma, 22.5% of tubulovillous polyps and 40% of villous adenoma contain carcinoma. When adenoma are less than 2cm

diameter only 1% of tubular polyps contain carcinomas as compared with 3.5% papillovillous and 10% villous adenoma. In tumour over 2cm in size carcinoma is present in 35% of tubular adenoma and over 50% of villous tumours.

CANCER PROMOTORS AND INHIBITORS:

PROMOTORS

Genetic	Familial adenomatous Polyposis
	Hereditary Non — polyposis Colonic Cancer
	Peutz — Jegher's syndrome
	Juvenile Polyposis syndrome
Diet	High fat diet
	Bile acids
Bacteria	Nuclear Dehydrogenases Producing Clostridia
Operations	Cholecystectomy'
	Gastric surgery
	Ureterosigmoidostomy
Irradiation	Ulcerative colitis
Diseases	Crohns diseases



INHIBITORS	
INHIBITORS	MECHANISM OF ACTION
Calcium	Increase cellular adhesion; decreases cellular proliferation
Vitamin D	Retards in vitro growth of human cancer cells, lowers level of ornithine decarboxylase in rates
Vitamin C	Deficiency increases colon carcinogenesis by alatonin A: administration may suppress experimental colon tumours.
Vitamin E	Free radical scavengers shown both to inhibit and to promote colon tumor growth in carcinogenesis models.
Daily sulfide (Garlic Compound) Allyl methyl trisulfide (garlic compound)	Inhibit carcinogen induced nuclear injury. Increases activity of glutathione S-transferase, which may inactivate carcinogens

IRRADIATION

X — rays are important mutagens. It is therefore hardly surprising that intracavitary irradiation in the treatment of carcinoma of the cervix uteri is associated with a small increased incidence of rectal cancer within the field of

irradiation. These cancers appear some 5 to 15 years later.

INFLAMMATORY BOWEL DISEASE

Ulcerative colitis, for a long time, have been known to increase the risk of colorectal cancer. The risk increases almost exponential with some 10 years after the onset of the disease, particularly in patients who have total colitis, those with a severe first attack, those who develop the disease in childhood, and those patients whose disease follows a relapsing course. Patients with mild distal colitis have no greater risk of developing cancer rectum than the normal population while patients with severe long standing disease have a 1 in 2 change of developing cancer after 30 years. Areas of dysplasia may be scattered throughout the colon, and rectum which explains the greater likelihood of multiple cancers among those with colitis. The tumours are seldom exophytic but usually flat and infiltrating, which makes diagnosis more difficult. The prognosis of these colitis cancers was originally thought to be particularly poor but more recent data suggests that there is no difference in prognosis of these colitis cancers among those with colitis. The tumours are seldom exophytic but usually flat and infiltrating, which makes diagnosis more difficult. The progression of these colitis to cancers was originally thought to be particularly poor but more recent data suggests that stage, there is no difference in prognosis compared to sporadic cancers. Crohn's colitis is also associated with an increased risk of cancer in the disease segment as well as in other area of the digestive tract. The risk is, however less than that associated with severe ulcerative colitis.

IMMUNO SUPPRESSION:

Long — term immunosuppression, either for the prevention of transplant rejection or as a consequence of HIV infection, predisposes to cancer. Lymphomas, which may affect the colon and rectum in immunosuppressed transplant patients. Small cell carcinomas of the colon and rectum which are rare in the otherwise healthy population have been reported in AIDS patients. However, there appears to be no association between adenocarcinomas of the colon, rectum and immunosuppression. Neoplasms themselves induce some degree of immune suppression, either directly through products of the malignant cells or indirectly through malnutrition and cachexia. Suppression of this immune response is probably mediated by secretion of soluble suppressor factors such as the retroviral protein p15E which is also responsible in a number of tumours including colorectal cancers.

PATHOLOGY, STAGING AND PROGNOSIS

Colorectal cancers, in common with most epithelial tumours, are polyclonal with clones of cells exhibiting differing degrees of 'Malignancy'. The more undifferentiated or more 'Malignant' clones are more likely to spread and metastasize. A tumour's biological behaviour is the main determinant of the tumour's propensity to spread locally and to metastasize and, therefore, indicates the ultimate prognosis. This is reflected to some extent by the Histopathological features of a cancer. Tumour secondaries, which are often derived from selected

clones of a polyclonal primary, are likely to behave in the same way as the primary tumour and will generally be more malignant.

Tumour biology is very much reflected by the stage of the disease. It is no surprise that there is a significant inverse relation between the length of history and the stage of the disease at diagnosis. Quicker growing tumours usually present with a short history and are advanced at the time of treatment. Although the clinical and pathological stage is a 'snapshot' in the life of a tumour, it provides the most accurate prognostic index; this may be refined further by the Histopathological features. Several staging methods are in use throughout the world, and each has its own strengths and weaknesses. The most commonly used are the Duke's classification and derivations of it, or the Union international Cancer center (UICC) TNM classification. The former has the advantages of great simplicity but considerable disadvantages from lack of precision. It does not reflect accurately the depth of tumour penetration, the extent of spread outside the bowel, the number of lymph nodes affected by tumour or the presence or absence of metastasis, all of which have an important bearing upon prognosis. Derivations such as the Astler — Coller and Australian classifications refine the Duke's staging but do not provide the flexibility of the TNM method, which enables useful division into subsets without being unduly complex. It is therefore most appropriate that surgeons adopt the TNM classification as a suitable international standard.

Staging gives information about prognosis in general, but particularly indicates the probability of occult hepatic metastases. Which is the major factor affecting survival. Patients with Dukes C tumour are more likely to have occult hepatic metastasis. Occult hepatic metastases account for the majority of deaths from colorectal cancer while only about 20% of patients die from local spread of the disease, which is also reflected, in the clinical stage.

STAGING OF TUMOUR:

1. Dukes classified carcinoma of the rectum into three stages.

- | | |
|---------|---|
| Stage A | The growth is limited to the rectal wall (15%) prognosis excellent |
| Stage B | The growth has extended to the extra rectal tissues but no metastasis to the regional lymph nodes (35%) prognosis reasonable. |
| Stage C | There are secondary deposits in the regional lymph nodes (50%) prognosis bad. |

ASTLER AND COLLER (1954):

Has made this classification more accurately in terms of

- | | | |
|----------|---|---|
| Stage A | : | Lesion limited to mucosa. |
| Stage B1 | : | Lesion penetrating muscularis propria but not through it. |
| Stage B2 | : | Lesion penetrating muscularis and extending into the serosa.
Negative lymph nodes. |
| Stage C1 | : | Lesion involved all layers of bowel wall except serosa
positive lymph nodes |

Stage C2 : Lesion involves all layers of the bowel walls

Stage D : Distant Metastasis

AJCC TNM staging system for colorectal cancer

T – Primary Tumor

Tx - Primary tumor cannot be assessed

To – No evidence of primary tumor

Tis – Carcinoma in Situ

T1 – Tumor invades submucosa

T2 – Tumor invades muscularis Propria

T3 – Tumor invades through muscularis propria into subserosa or into non
peritonealized pericolic or perirectal tissues.

T4 – Tumor directly invades other organs or perforates visceral peritoneum.

N- Regional Lymph Nodes

Nx – Regional Lymph Node cannot be assessed

N0 – No regional Lymph Node metastasis

N1 – Metastasis in 1-3 regional Lymph Nodes

N2 – Metastasis in 4 or more regional Lymph Nodes

M – Distant metastasis

Mx – Distant metastasis cannot be assessed

M0 – No distant metastasis

M1 – Distant Metastasis

Stage wise comparison

STAGE	T	N	M	Dukes	MAC
O	Tis	No	Mo		
I	T1	No	Mo	A	A1
	T2	No	Mo	A	B1
IIA	T3	No	Mo	B	B2
IIB	T4	No	Mo	B	B3
IIIA	T1-T2	N1	MO	C	C1
IIIB	T3-T4	N1	MO	C	C2/C3
IIIC	Any T	N2	MO	C	C1/C2/C3
IV	Any T	Any N	M1		D

MACROSCOPIC APPEARANCE:

Macroscopically cancer rectum may be

1. Proliferative
2. Ulcerative
3. Annular
4. Diffusely infiltrating
5. Colloid

1. The proliferative type is the most frequently occurring one. It forms a fleshy bulky polypoid mass that bulges into the lumen of the bowel. It is a malignant adenoma of slow growth and of low order of malignancy and arises from the wall of the gut from a wide base. The proliferated growths are usually well differentiated adenocarcinoma.
2. Ulcerative growth present as a typical malignant lesion with raised irregular everted edges and a sloughing floor. It has tendency to infiltrate the bowel wall.
3. The annular type of growths is seen typically in the upper 1/3 of the rectum. Small densely hard slow growing tumour that do not project into the rectum apparently but tends to encircle the gut wall and thus obstructing the passage of solid faecal matter.
4. Diffusely infiltrating carcinoma colon & rectum. It proceeds a diffuse thickening of the intestinal wall usually extending at least 5 to 8 mm and for the most part covered with mucosa but there is usually ulceration at

some point. This form of carcinoma is some times found as an extension of one, of the other gross type of the growth. It is also not infrequently the type of the growth. It is also infrequently the type of carcinoma that develops in ulcerative colitis.

5. Colloid carcinoma usually forms a bulky growth with very suggestive of gelatinous appearance. There may not be extensive ulceration and infiltration.

HISTOPATHOLOGICAL GRADING AND TYPING:

Grading depending upon subjective interpretation of the degree of differentiation at histological examination. Various grading systems have been proposed, but grading into two broad groups, low or average grade tumours which are well to moderately differentiated and high grade or undifferentiated induces the variation between observers while at the same time providing useful prognostic information. Patients with high grade cancers have worse prognosis when compared with patients with well differentiated lesions after taking account of the tumour stage.

Typing on the other hand reflects the cellular characteristics. Mucinous signet cell and small cell tumour are the variants of the more common adenocarcinoma and the frankly undifferentiated cancers again typing may give some cell tumour have a prognostic information. Signet cell and small cells. Tumours have a worse prognosis than adenocarcinoma. While mucinous lesions tend to recur locally. Both of these tumours are however more common in the

anus. Other varieties are carcinoid and Leiomyosarcoma.

Histological features such as vascular, lymphatic or peri neural invasion are prognostically unfavourable. By contrast lymphocytic infiltration of the tumour and a histolytic reaction in the regional lymph nodes are minor favourable prognostic features.

CLINICAL FEATURES

Carcinoma of the rectum is not uncommon early in life and when the disease commences in youth in spite of radical treatment, death usually results within a year. Usually the early symptoms are so slight that the patient does not seek advice for 6 months or more.

COMMON

- o Abdominal pain
- o Bleeding
- o Unexplained anemia
- o Change in bowel habits

UNCOMMON

- Acute
 - o Obstruction
 - o Perforation
- o Abdominal mass
- o Metastatic disease

BLEEDING:

Bleeding is the earliest and most constant symptom. There is nothing characteristic about the time at which it occurs neither is the colour or the amount of blood distinctive. Often the bleeding is slight in amount, and occurs at the end of defecation or is noticed because it has stained underclothing.

Indeed more often than not the bleeding in every respect simulated that of internal hemorrhoids and it is lamentable that, in spite of the repeated exhortation, the patient's doctor sometimes fails to examine the rectum but prescribe a salve while the growth advances to inoperability.

SENSE OF INCOMPLETE DEFAECATION:

The patient has his bowel open but feels that there are more faeces to be passed. This is a very important early symptoms and is almost invariably present in tumours of the lower half of the rectum. The patient may endeavour to empty the rectum several times a day (spurious diarrhea), often with the passage of Hams and a little bloodstained mucus (blood slime).

ALTERATION IN BOWEL HABIT:

Alteration in bowel Habit is the next most frequent symptom. The patients may find it necessary to start taking an aperients, or to supplement his usual doses and as a result a tendency towards diarrhea ensues. A Patient who has to get up before the accustomed hour in order to defecate and one who passes blood and mucus in addition to faeces (early morning bloody diarrhoea) is usually found to

be suffering from carcinoma of the rectum. Usually it is the patient with an annular carcinoma at the pelvirectal junction who suffers with increasing constipation, and the one with a growth in the ampulla of the rectum with early morning diarrhoea.

Identification of surface tumour antigens such as carcinoembryonic antigen, oncogene expression and DNA ploidy potential refinement but these are not yet in routine use.

PROGNOSIS

Stage remains the most important indicator of prognosis. The prognosis of patients with adequately treated Stage IV cancers is little different from that of an otherwise healthy population of the same age. 95 to 100% live 5 years or more after resection. Patients with cancer spread through the serosa only have a 40 to 60% chance of living 5 years, although the prognosis is more favourable if the tumour is only just through the serosa and is correspondingly worse if adjacent structures are invaded. Lymph node metastasis further adversely affects prognosis with only about 30% of patients surviving 5 years. Sub classification is useful. The survival curve of patients with colon and rectal cancer treated by resection is curvilinear, reaching a nearly flat plateau.

PAIN:

Pain is a late symptom but pain of a colicky character accompanies advanced growths of the recto sigmoid and is due to some degree of intestinal obstruction. When a deep carcinomatous ulcer of the rectum invades the prostate or bladder, there is severe pain. Pain in the back, or sciatica, occurs when the growth invades the sacral plexus. Weight loss is suggestive of hepatic metastases. When the peritoneum has become studded with secondary deposits ascites results.

MANIFESTATIONS OF ADVANCED DISEASE

Locally advanced - Dysuria, frequency

Rectal cancers – Neuropathic pain syndrome

Females - RVF (Recto Vaginal Fistula)

Metastatic Liver metastasis - - Jaundice Hepatomegaly

Supraclavicular node enlargement

PRE-OPERATIVE EVALUATION

Preoperative evaluation should include the following

CARCINOEMBRYONIC ANTIGEN:

First described by (Gold and Freedman) in 1965, carcinoembryonic antigen is a foetal protein present in tumours of the gastrointestinal tract and in foetal tissue but not in adult intestinal tissue. Plasma concentration of carcinoembryonic antigen may be elevated in patients with colorectal carcinoma but they may also be normal.

In addition, elevated plasma concentrations of carcinoembryonic antigen occur in patients with cholelithiasis, alcoholic and chronic active hepatitis, diverticulitis, pancreatitis, renal failure and fibrocystic breast disease and in patients who smoke. This lack of specificity precludes carcinoembryonic antigen assays as a screening test. The preoperative concentration of carcinoembryonic antigen has prognostic importance and has been shown to correlate with the size and degree of differentiation of carcinomas of the colon and rectum. Combined data from several large series have indicated that an elevated preoperative carcinoembryonic antigen concentration correlated with poorer survival patients with carcinoma of the colon and rectum, independent of the stage of disease at diagnosis. After curative resection, the Carcinoembryonic antigen concentration usually returns to normal within one month. A persistently elevated concentration implies residual disease.

CLINICAL APPLICATIONS FOR MOLECULAR MARKERS TN COLORECTAL CARCINOMA

SCREENING:

Molecular analysis of endoscopic biopsies.

Identification of high — risk allelotypic change

Use of proliferative markers (ornithine decarboxylase) to indentify preneoplastic change.

DIAGNOSIS:

Molecular analysis to identify risk factor for invasion and metastases to select aggressive surgery for polyps or aggressive adjuvant therapy for carcinoma.

Intra operative immuno detection to identify occult metastases and guide surgery.

POST OPERATIVE FOLLOW UP:

Serial scanning with mixed monoclonal products.

TREATMENT:

Pharmacologic manipulation of signal transduction and surface molecules.

Monoclonal derived immunothrapy or chemotherapy.

Active immunotherapy utilizing tumour specific antigens.

BIOCHEMICAL MARKERS

In the last decade, the molecular biologist have revolutionized the understanding of the genetic mechanisms of carcinogenesis and our ability to manipulate the genome. The immunobiologist have been able to develop the means by which onco developmental antigens, unmasked by genetic events can form detection to management of metastatic disease these development will effect change in clinical practice (Passaro E)²⁵.

At the screening level, use of molecular analysis may detect in early life those individuals who carry genetic defect. Searching for individuals who are hemizygous for tumour suppressor genes may identify a population at high risk. Use of mucosal proliferative markers such as polyamine metabolic enzymes such as ornithine decarboxylase from normal mucosa may identify individuals who already show expansion of the proliferate compartment.

Analysis of tumor tissues by the same molecular techniques may provide important prognostic information. The loss of the DCC locus, the appearance of surface CEA or increased amounts of plasminogen activators such as urokinase may identify the biologically more aggressive tumor This information may incline the surgeon to recommend resection for dysplastic polyp or select candidates more accurately for adjuvant chemotherapy.

TUMOUR PLOIDY:

The technology exists to analyse DNA from small biopsy specimens of tumours using flow cytometry. Ploidy may correlate with the clinical behavior of the tumor. Tumours in early Astler — coller stage tended to be non deployed Aneuploidy is an independent predictor of recurrent disease. Other investigation have demonstrated that the ploidy status is of equal or greater importance as a prognostic indicator than the pathologic stage of the lesion. Ploidy may have carcinoma; however its exact role will need to be studied as it becomes a prognostic variable in therapeutic trials.

EVALUATION OF SYNCHRONOUS LESIONS:

The incidence of synchronous carcinoma has been reported to be between 2% and 7 and the incidence of synchronous benign polyposis 12% to 62%. Before resection total colonic evaluation should be performed to detect the presence of a synchronous lesion. Colonoscopy is the preferred method for this evaluation. Synchronous polyps may be excised. In a review of 389 patients. It has been found that one half of the synchronous carcinomas found by colonoscopy were not detected by barium enema examination and more than half of these carcinomas would not have been included in the planned resection. Because it provides the opportunity to remove synchronous polyps outside the planned area of resection, preoperative colonoscopy in patients with colorectal carcinoma is favored.

If colonoscopy is unavailable, flexible sigmoidoscopy and double contrast barium

enema study should be performed. Most authors believe that air contrast enemas are more sensitive in detecting carcinoma of the colon however Johnson et al found no difference in either the rate of error or the ability to find lesions in an earlier stage when the results of barium enema study and a double — contrast barium enema study were compared.

ASSESSMENT OF CARCINOMA OF RECTUM:

Most patients with carcinoma in proximal or distal location can undergo sphincter saving procedure with resection of the lesion and restoration of bowel continuity for patients with carcinoma in a distal rectal location, therapeutic options are based on preoperative assessment of the lesion. Favorable localized lesions can be treated with either local excision or fulguration. Thus, abdomino — perineal resection and a permanent stoma can be avoided by accurate evaluation including the size of the lesion, extent of circumferential involvement, degree of differentiation and depth of invasion. Methods of preoperative assessment include the use of digital rectal examination proctoscopy and intra rectal ultra sonography and other imaging techniques.

DIGITAL RECTAL EXAMINATION

- Most important clinical examination
- 75% rectal cancers are palpable
- Exact length from anal verge, nature of lesion, extent ,circumference ,mobility and fixity to surrounding structures
- Growth in redundant sigmoid colon
- Pelvic deposits of proximal colon

ENDOSCOPIC ULTRASONOGRAPHY

- Endorectal USG
- Best study in distal 12cm of rectum
- High frequency probe 10MHz is used
- T staging very accurate
- T2- T3 differentiation is more accurate
- Nodal pickup rate is 59% **PREVENTION OF SEPSIS:**

Factors that have an important impact and reduce the changes of postoperative sepsis and leakage are

- Prophylactic antibiotics
- Mechanical bowel preparation
- Surgical technique like rapidity of operation exquisite and gentle handling of tissue. Techniques of suturing and anastomosis and complete hemostasis and avoidance of dead space.

- Site, size& location of the lesion
- Noncontrast -Hypodense lesion
- Contrast - Hypodense or isodense
- Lymphnodes—sensitivity increases when size> 1 cm

MRI

Indeterminate liver lesion on CT

- Rectal lesion
- Endorectal, pelvic coil - improve pick up rate
- Endorectal coil - accurate T staging

PREPARATION OF THE BOWEL:

Two techniques for accomplishing a surgery of “Near clean Category” has evolved with one there was mechanical cleaning of the bowel with other various antimicrobial agent were given to sterilize the gut.

PROPHYLACTIC ANTIBIOTICS:

Mechanical preparation does not remove from the colon all the bacteria. For this reason many surgeons used to give a non — absorbable antibiotic for a few days prior to operation. There is conclusive evidence that the use of prophylactic broad spectrum antibiotics effective against both aerobic and anaerobic organism can significantly reduce the risk of subsequent wound infection. The most commonly

used combinations are metronidazole and aminoglycoside or cephalosporin. The drugs would be given with the premedication or at the anesthetic induction in order to achieve the maximum tissue concentration at the cefuroxime 750 mgs plus metranidazole 500mg 1 hour prior to surgery plus another two doses of each Drug at 6 and 12 Hrs After surgery.

There is little doubt that good mechanical cleansing of the bowel is of considerable value. Traditionally this has been achieved by placing the patient on a liquid or elemental diet for 2-3 days followed by the administration of a cathartic agent. Nowadays a modified technique involves the use of polyethylene glycol (peglec solution) which can be drunk or administered by a nasogastric tube 24 hours preceding the planned procedure. This can however 'lead to potassium loss which may be severe in the elderly patient who are already on diuretics and requires up to date electrolyte estimation prior to operation. Adequate mechanical preparation may not be possible in those patients with an obstructing lesion or those patients coming to emergency surgery. On table lavage of the colon proximal to the obstruction using the appendix stump as a portal entry can be very effective and permits primary anastomosis to be performed more safely. Involves complete resection of the rectum, mesorectum, levator muscles and anus with formation of a permanent colostomy. Rectal cancer involving levator muscle or anal sphincter are best managed by APR

TME (Total Mesorectal Excision)

- Should be performed in all cases done with curative potential
- Basis: high incidence of nodal involvement in rectal cancers
- Reduces the local recurrence rate

SPHINCTER SAVING PROCEDURES

- Low Anterior Resection- Colorectal Anastomosis.
- Extended Low Anterior Resection- Coloanal Anastomosis.

- Local Excision.
- Ablative therapies.

OPTIONS ACCORDING TO THE SITE:

- Upper Rectum — Anterior Resection- Colorectal Anastomosis.
- Middle Rectum — Low Anterior Resection- Colorectal Anastomosis.
- Lower Rectum — Extended Low Anterior Resection- Coloanal Anastomosis.

LOCAL EXCISION

- Highly selected patients (only 10% suitable)
- Patients refusing surgery/colostomy.
- Patients medically unfit for Major surgery.
- Local palliation.

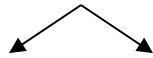
BASIS OF LOCAL EXCISION

- To decrease chances of Local recurrence.
- To exclude patients with N +ve disease.

LOCATION OF THE TUMOR

- 6-8 cm from anal verge — Transanal Approach.
- Middle 1/3 rectum — Transanal Endoscopic Microsurgery or Posterior Approach.

Upper 1/3 rectum



Full thickness excision

not possible

Risk of Fecal

spillage

SIZE

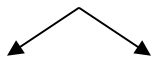
- Should be <3 cm.
- Should not occupy > 1/3 of circumference.

GRADE

- Only Well (or) Moderately differentiated tumors

PREOPERATIVE EVALUATION

- Clinical examination is most crucial.
- Endorectal USG is a MUST



To assess T stage

Accurately

To exclude N +ve

Disease

- MRI, with Endorectal coil.

APPROACH

TRANSANAL

- Transanal Excision.

- Transanal Endoscopic Microsurgery.

POSTERIOR APPROACH

- Trans-Sacral — Kraske's
- Trans-Sphincteric — York Mason's

TRANSANAL APPROACH

- Commonly used.
- Suitable for Lower third lesions.
- Good lighting and retraction essential.

TRANSANAL ENDOSCOPIC MICROSURGERY

- Carbondioxide insufflation via 40 mm operating Rectoscope.
- X 6 magnification.
- Specialized Endoscopic instruments.

TRANS-SACRAL - KRASKE'S

For Middle third rectal lesions.

Coccyx and Lower two segments of Sacrum excised.

Increased risk of fecal fistula.

SPHINCTERIC - YORK MASON'S

No Sacrectomy.

Sphincteric complex carefully delineated, divided and reapproximated.

Decreased risk of fecal fistula.

Increased risk of incontinence.

ECTROCOAGULATION LASER

Patients refusing surgery/colostomy.

Patients medically unfit for Major surgery.

Same selection criteria.

Great care in Anterior lesions.

Disadvt: Absence of pathology, multiple sessions.

ENDOCAVITARY RT - PAPILLION'S

Direct contact irradiation with Cone.

Tumor doses of 10,000- 12,000 cGy reached.

3 - 4 sittings over 8 wks with 2 wk intervals.

Mucosal necrosis.

Can be combined with EBRT for T2 lesions.

REVIEW OF LITERATURE

Initial results from a European prospective randomized trial with preoperative external radiation suggested that reduction in local recurrence, but no change in long-term survival, could be achieved.

Later reports from the University of Florida showed not only marked reduction in local recurrence but also improved long term survival.

In a extensive study by Kodner IJ, (Ann Surg1989; 209(2):194) using preoperative external radiation therapy ,no complications have been attributed to the use of radiation therapy. In particular, no colostomis have been needed and no leaked anastomoses have occurred that could be attributed to the radiation. One component of the anastomosis, however, must not have been irradiated, this is accomplished by resecting the entire sigmoid colon and using descending colon for the proximal component of the anastomosis of for the colostomy.

Rectal cancers that are suspected of being deeply invasive but are not significantly tethered to the surrounding tissue and are not histologically poorly differentiated receive 2000cGy of external radiation during a 5 day period and are then resected early the following week. Those cancers that are even more aggressive, in that they are poorly differentiated or are significantly fixed to the surrounding tissue are treated with a regime that

not only controls tumor deposits in the pararectal tissue, but also allows tumor shrinkage and increases the chances of definitive resectability. This regimen consists of 4500cGy administered during a 5 week period (2 treatments), a 6 to 7 week waiting period, and then resection. This regimen allows maximum tumor shrinkage, without waiting so long that the cancer cells begin to repopulate. It is also chosen, as a schedule that allows the acute inflammatory changes of the radiation to subside, yet it allows the surgery to be performed before the chronic fibrotic change of the radiation occur. The long term results of this series show that the use of combined preoperative external radiation followed by definitive surgery significantly increases the long-term survival as compared to many reports in the literature, and local recurrence of rectal cancer essentially was eliminated.

Of most interest was the fact that the survival of Duke's B & C lesions was very similar, perhaps indicating that if this modality is used, the importance of determining lymph node involvement pretreatment becomes less critical. The statistics also revealed that the 2000-cGy regimen was very effective and could be used for invasive cancers, unless the tumor is fixed, poorly differentiated, or extremely large.

The study concluded that preoperative radiation therapy controls the

cancer at the peripheral or tangential margin of resection, and that it destroyed tumor deposits in pararectal lymph nodes. The series has been ongoing for 15 years. Analysis of all variables showed histologic differentiation and fixation to be of importance. In particular lymph node involvement was not a major variable. Therefore , if preoperative radiation therapy is used, a clinical staging system may become possible.

Rosanna Berardi, Elena macaroni, azzurra onofri, university of italy, showed that multimodality treatment have improved the prognosis of locally advanced rectal cancer with local recurrence decreases from 40% to <10%, and overall survival improving from 50% to 75% in the last 40 years.

National research council (NRC), of the United Kingdom and the National cancer Institute of Canada (NCIC) analysed a 7 year trial and shown that short-term preoperative radiation (25 Gy over 5 days) results in a significant reduction in the local recurrence rate and disease-free survival for all stages of rectal cancer.

PRE OP / POST OP RT

	Pre op RT	Post op RT
Sphincter preservation	39%	19%
Local failure	7%	11%
Acute toxicity	2.7%	8.5%

Diagnostic schema for restaging

- Clinical examination
- Endoscopy
- Pelvic, abdomen CT or MRI (comparable with previous scan)
- Endosonography (comparable)

Methods of down-staging evaluation

- Pooling of whole data
- Matching of both data, before Neoadjuvant, before surgery
- Assessment of down-staging, outlining indicatively percentages of tumor volumetric reduction: > 50%, 30-40%, 20-30%, <10%.
- Survey of surgical procedures related to achieved down-staging

Table 1. Results of trials comparing surgery vs. neoadjuvant therapy

	Surgery	Rt+Surgery
Stockolm II Trial (S) (1996) (9)	56%	62%
Swedish Trial (S) (1997) (7)	48%	58%
EORTC (L) (1988)	49%	52%
MRCRCWP (L) (1996)(16)	46%	52%

(RT alone; S: Short Term; L: Long term)

Comparisons study

	Surgery	Surgery+RT	Surgery+RT+ chemotherapy
Local failure	25%	20%	10%
Disease free survival	65%	50%	45%
5 yr survival	45%	33%	26%

MATERIAL AND METHODS

This study has been conducted in the Department of Surgery, Govt. Rajaji hospital, Madurai during 2008-2009. Patients admitted in general surgery units, surgical gastroenterology & surgical oncology department were selected. All these patients were subjected to detailed history, thorough clinical examination of the abdomen, digital rectal examination, proctoscopy, and scopy guided biopsy was taken for Histopathological examination.

All these patient had base line biochemical investigation done and included Blood- Hb%, TC, DC, sugar, urea, creatinine, Urine – sugar, albumin, microscopy Liver function test Ultrasonography Double contrast Barium enema when warranted Computed Tomogram plain and contrast enhanced, Magnetic Resonance Imaging when feasible.

All patients were counselled with regards to treatment side effects, possible outcome with and without the preoperative chemo-radiotherapy, the side effects during the course. The patients were counselled with regards to Colostomy. During the counselling session, a previous Ostomate was included.

Indications for neoadjuvant therapy, basing a difference between the absolute and relative one were explained.

Dosages of drugs and radiation were taken care.

Comparing indicatively of clinical and diagnostic data before neoadjuvant therapy and before surgery was done.

Patients were staged according to the TNM classification system using clinical and radiological data.

RADIATION THERAPY

The main reasons for favouring pre-operative radiation have been the desire to reduce their rate of both pelvic recurrence and extra pelvic metastases based on the assumption that some metastases arise from cells released during intra operative manipulation of the cancer, the lower likelihood of late radiation enteritis because small bowel is less likely to be adherent in the pelvis prior to surgery,& the relatively greater radio responsiveness of normally oxygenated cancer cells relative to cells and tissues that may be hypoxic secondary to alteration in vascularity resulting from pelvic surgery.

Radiotherapy guidelines

Anal verge ,dentate line/ sphincter –identified by radio opaque markers & rectal contrast.

Balance between adequate distal coverage &minimal RT to sphincter.

AP & PA fields –lateral border –pelvic side wall

Lateral field – superior & inferior margin

Post border- includes presacral soft tissue so field covers anterior border of sacrum with at least 1.5 cm margin for motion & dosimetric variation.

Anterior border of lat field –cover post border of vagina & prostate, anterior extent of tumor & anterior edge of sacral promontory

Chemotherapy

5-fluorouracil (5-FU)- Antimetabolite ,it's a pyrimidine antagonists is converted in the body to the corresponding nucleotide 5-fluoro-2-deoxyuridine monophosphate, which inhibits thymidylate synthase and blocks the conversion of deoxyuridic acid to deoxythymidylic acid. Selective failure of DNA synthesis occurs due to non availability of thmidylate. Thymidine can partially reverse its toxicity. Fluorouracil itself get incorporated into nucleic acid and this may contribute to it toxicity. Even resting cell are affected, though rapidly multiplying ones are more susceptible.

Efforts have been made to enhance the activity o 5-FU by co-administration with other agent. The potency of 5-FU can be enhanced by the administration of reduced folate- LEUCOVORIN when 5-FU is given in

combination with leucovorin response rates range from 21% to 48%. A randomized prospective trial compared 5-FU alone, sequentially methotrexate plus 5-FU and leucovorin plus 5FU among patients with untreated colorectal cancer. Response rates of 11%, 5% and 49.8% respectively were achieved.

The side effects associated with the regimen of 5-FU plus leucovorin are similar to those of 5-FU alone although the severity may be greater. Patients may develop severe diarrhoea or mucositis. Hospitalization for intravenous hydration occasionally needed.

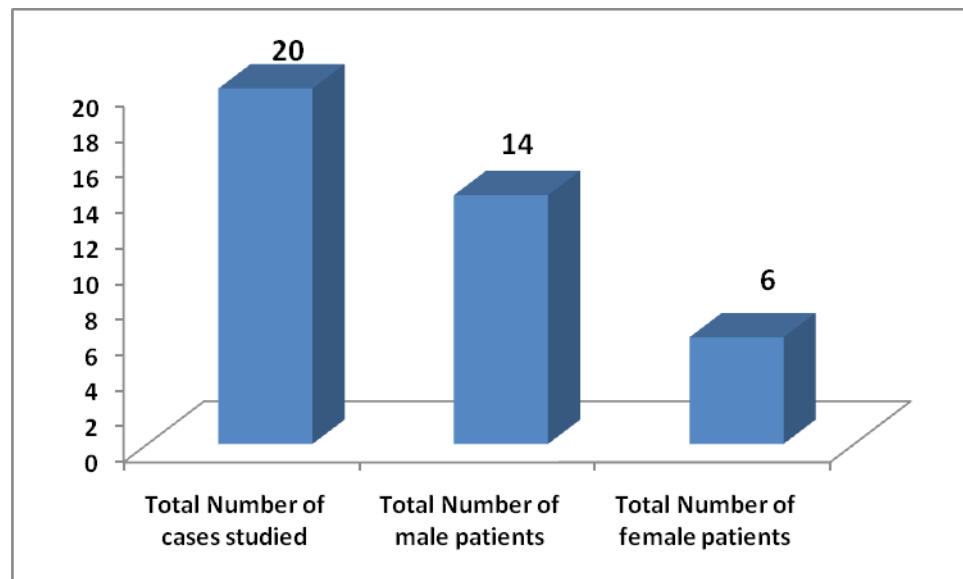
All patients in the study, after thorough clinical, radiological, histopathological and baseline investigation and counselling underwent radiotherapy 4500 to 6000cGy in 150 to 200cGy fractions for 5 days a week and concurrent 5-FU 10mg/kg and leucovorin 30mg infusion every 21 days for 6 cycles and restaged after the completion of the therapy clinically and radiologically.

RESULTS

Total Number of cases studied - 20

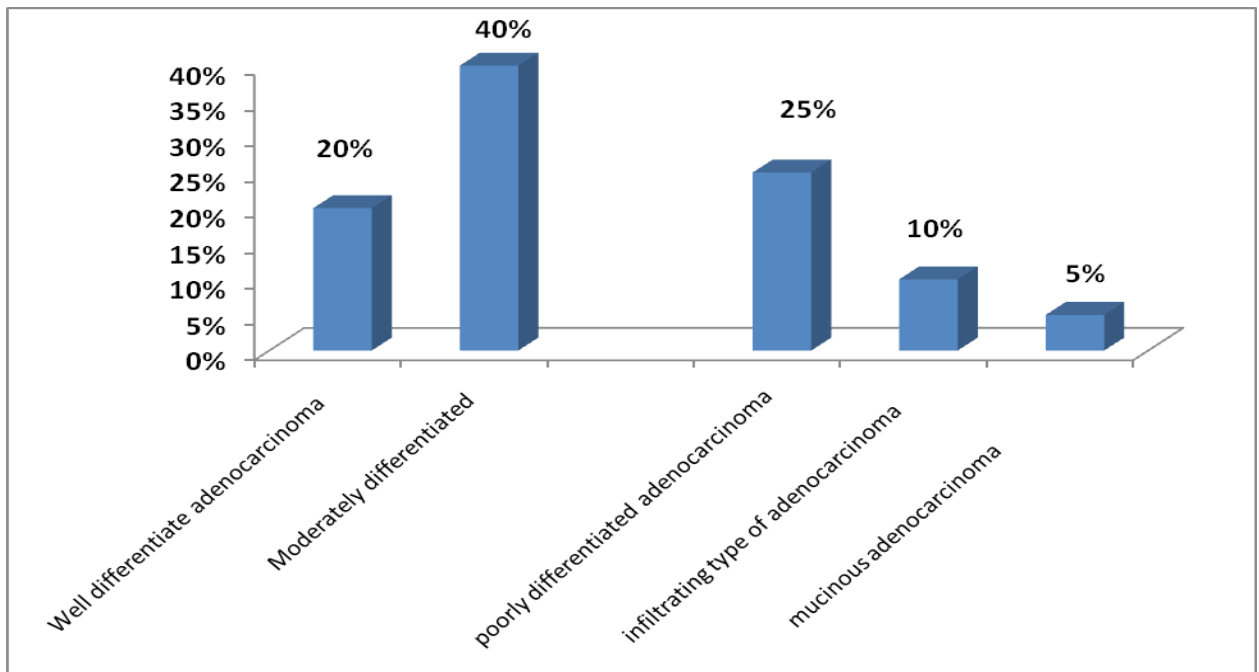
Total Number of male patients - 14

Total Number of female patients - 06



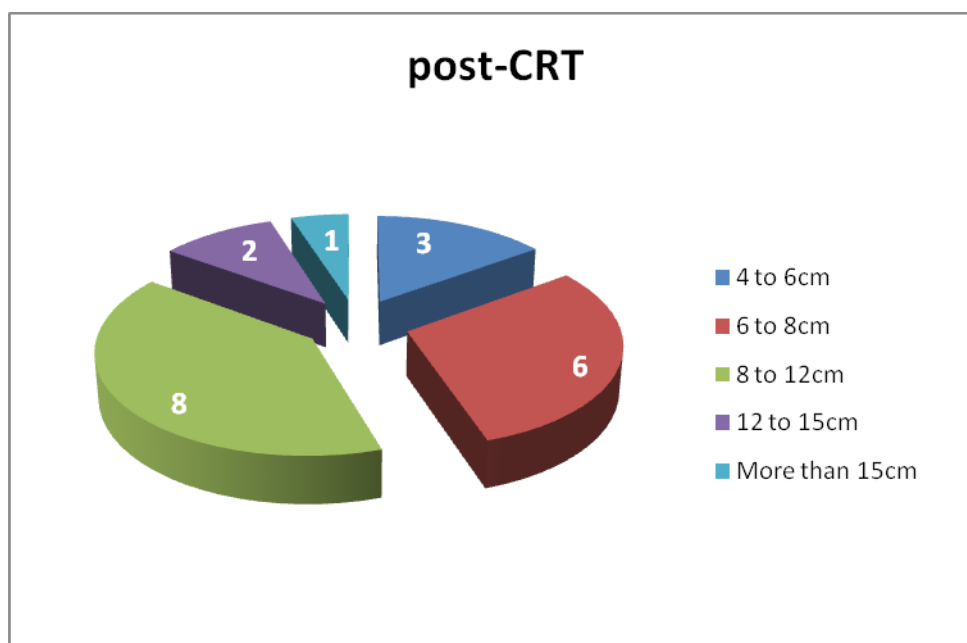
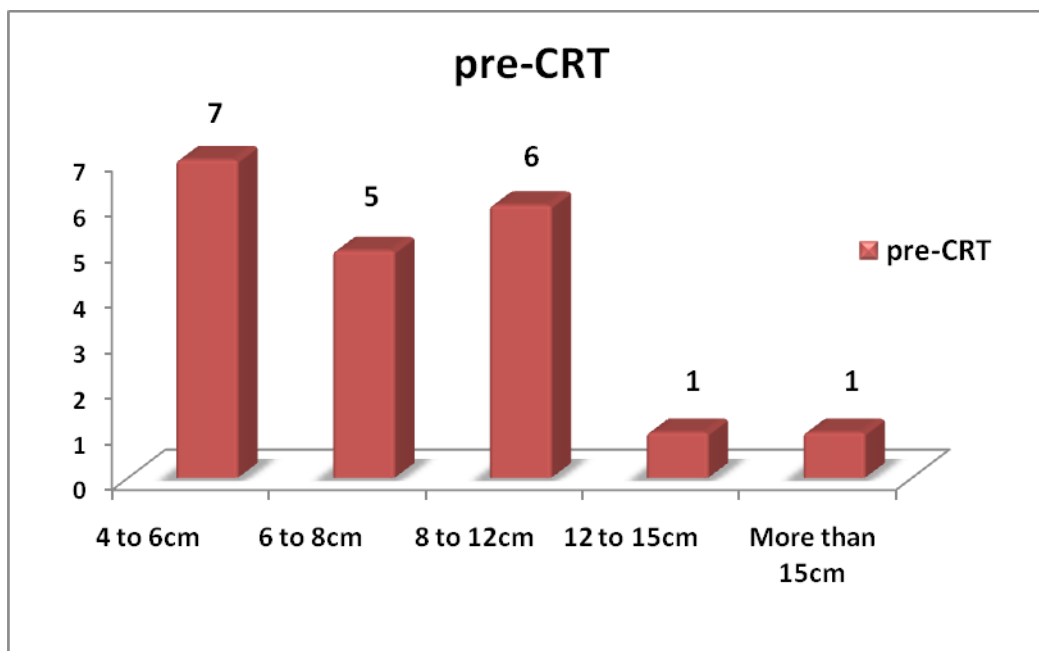
The distribution of cases according to their histopathology

- Well differentiate adenocarcinoma - 4 - 20%
- Moderately differentiated
adenocarcinoma - 8 - 40%
- poorly differentiated adenocarcinoma - 5 - 25%
- infiltrating type of adenocarcinoma - 2 - 10%
- mucinous adenocarcinoma - 1 - 5%



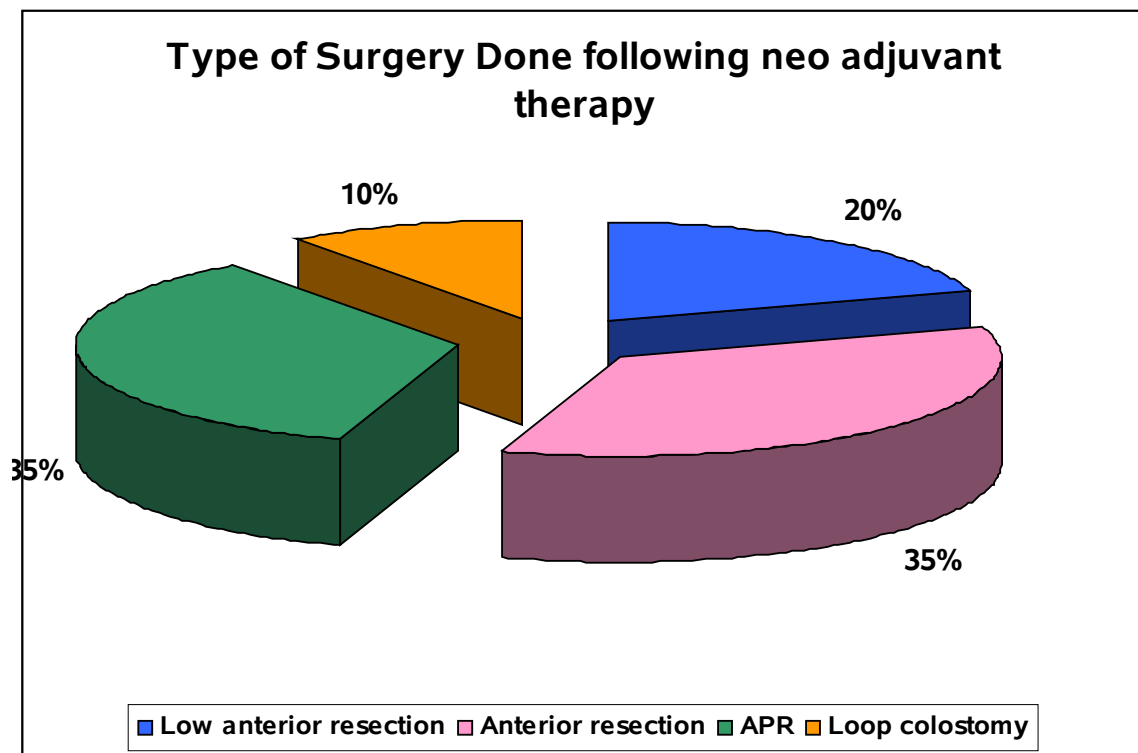
Distance of lower extent of lesion from the anal verge

	pre-CRT	post-CRT
4 to 6cm	+7	3
6 to 8cm	-5	6
8 to 12cm	-6	8
12 to 15cm	-1	2
More than 15cm	-1	1



Type of surgery done following neo adjuvant therapy

Sl. No	Surgery	No. of patients	Percentage
1.	Low anterior resection	4	20%
2.	Anterior resection	7	35%
3.	APR	7	35%
4.	Loop colostomy	2	10%



DISCUSSION

Rectal malignancy is one among the common malignancy presenting at GRH, Madurai.

The reason for which most patients seek medical attention was Bleeding Per Rectum.

40% of the patients had moderately differentiated

25% of them had poorly differentiated adenocarcinoma

20% of the patients had well differentiated adenocarcinoma

10% of the patients had invasive differentiated adenocarcinoma

5% of the patients had mucinous differentiated adenocarcinoma

90% of the patients underwent definitive surgery, while Jetekog reported 85.6%

Abdomino perineal resection and anterior resection was the commonest surgery performed in the study constituting about 70%.

55% of total patients had undergone a spincter preserved procedure.

In 35% of patients, tumor regression of $\geq 2\text{cm}$, $\leq 3\text{cm}$ was noted followed neoadjuvant therapy on Digital Rectal examination.

All patients were subjected to chemo-radiotherapy for 6weeks, followed by surgery. 20% of the patients underwent Low Anterior Resection, 35% of patients underwent Anterior Resection, 35% of the patients

underwent Abdomino-Perineal Resection, 10% had undergone Loop Colostomy.

Total number of patients who underwent APR was 35% which without The Neo-Adjuvant therapy would have been 60% i.e., **25% patients were benefited from a sphincter saving procedure**

Out of the 20 patients 2 female patients had posterior vaginal wall fixity which following CRT underwent APR with out resection of the posterior vaginal wall.

The reason for inoperability in the study was anteriorly bladder fixity.

Morbidity

Among 7 patients who underwent APR, 4 patients (55.5%) had perineal wound infection, which was treated with appropriate dressing and antibiotics after obtaining culture and sensitivity reports.

Out of 18 patients, who underwent definitive surgery 6 patients constituting 33.33% had abdominal wound infection and were treated with daily dressing and appropriate antibiotics.

Mortality – 10%

2 patients had died post-operatively, one patient on 1st POD due to Pulmonary Embolism and the other on 8th POD due to ARDS.

CONCLUSION

Goals of Neoadjuvant are varied ,has advantages over adjuvant therapy Neoadjuvant therapy may be considered a rational approach for treatment of curative Rectal cancer.

Volumetric reduction of neoplasia, mesorectum and lateral pelvic nodes was evident in 90% of the patients

There was 25% improved surgical feasibility for a sphincter saving procedure in the study.

There was a definite reduction of side effect on close organ, mainly on small bowel, which are not displaced into pelvis by post-operative adhesions.

There was no local recurrence in patients who underwent surgery during the 2 year follow up period

All Non-Metastatic patients are candidates for pre operative neoadjuvant therapy.

Patient selection by detailed pre-op staging very important.

Radiation total dose/fraction/fields are not uniformly agreed upon.

Neoadjuvant therapy needed in many cases.

BIBLIOGRAPHY

1. Peter I Morris & Ronald A Malt: Oxford text book of surgery: Oxford University Press: I Edition: 1994 I8;3 1660
2. John I Murray Colorectal cancer, Surg. Clin N.A. Vol 173 No 1. Feb 1993.
3. David C Sabiston — Text Book of Surgery 18th Edition 1991 W.B. Saunders, 923, 944-946.
4. Marcus J. Burnstein : Dietary factors related to colorectal neoplasm. Surg. Clin. NA. Vol. 73:1 1993. 13-30.
5. Lipkin M Newmark H, Boone CW et al: Calcium Vitamin D and colon cancer. Cancer Res. 51:3069, 1991.
6. John Goligher: Surgrey of the Anus, Rectum, Colon 5th Edition tiudall 1984 431,434,435
7. Bailey and Love's : Short Practice of Surger 25 edition.
8. Arnaud JP Koehi C Adloffm: Carcinoembryonic antigen in the diagnosis and prognosis of colorectal carcinoma. Dis. Colon Rectum 23; 141 — 144, 1980.
9. Nicholls Rj. York Manson A. Marson BC et al: The clinical staging of rectal cancer. Br. 3. Surg. 69:404-409, 1982.
10. A. Cusehieri L: ER. Essential surgical practice — 3M Edition Butterworth 1995-78: 1367
11. Ziengibl H Husmann B Herman•ex P : Intraoperative spillage of tumour cells

in surgery for rectal cancer Dis. Colon Rectum 33:610- 14 1990.

12. Turnbull RB Kyle K Watson et al: Cancer of the colon. The influence of the “no touch isolation” technic on survival rates. Ann. Surg, 166: 420- 425, 1967

13. Miles EE: A method of performing abdominoperineal Resection for carcinoma of the rectum and of the terminal portion of the pelvic colon, Lancet2: 1812-1813, 1908.

14. Goligher JC: The blood supply of the sigmoid colon and rectum br. J.Surg. 37: 157-162, 1949.

15. Crile G Jr and Turnbull R.B. Jr: The role of electrocoagulation in the treatment of carcinoma of the rectum. Surg. Gynecol Obstet., 135:391, 1972.

16. Sugarbaker ED: Coincident removal of additional structures in resections for carcinoma of the colon and rectum. Ann. Surg 123: 1036-1046, 1946.

17. Kodner et.al

PROFORMA

Name CRT – Regime & Date of starting

therapy

Age/sex

I.P. No.

D.O.S.

D.O.A.

DRE – Pre CRT, Post CRT

USG

Colonoscopy

CT

MRI

(Optional)

Biopsy

Histopathological Report

Investigations

Hb%, TC, DC

Blood grouping

Urine

Sugar

Albumin

Sugar

Urea

S.creatinine

Blood

Stool for occult blood

X ray chest

ECG

Surgical Procedure

Operative findings

Post operative follow up

ABBREVIATIONS

APR	-	Abdomino Perineal Resection
AR	-	Anterior Resection
LAR	-	Low Anterior Resection
Pre CRT	-	Pre-Chemo Radiotherapy
Post CRT	-	Post-Chemo Radiotherapy
Mod. Diff	-	Moderately Differentiated
PD	-	Poorly Differentiated
WD	-	Well differentiated
MAC	-	Mucinous adenocarcinoma
IC	-	Infiltrating adenocarcinoma
PLC	-	Palliative loop colostomy
CM	-	Centimeter
Sx	-	Surgery done
DOS	-	Date of Surgery
NP	-	Not palpable
DRE	-	Digital Rectal Examination